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BOULDER RIVER SCHOOL AND HOSPITAL, BOULDER, MT

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## UPDATING: THE USE OF DAILY EXERCISES TO IMPROVE TEST PERFORMANCE

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The Boulder Training Center (BTC) is a demonstration classroom designed to teach direct-care staff the methods of training the residents of Boulder River School and Hospital. Through "hands-on" practice with residents, lectures, and tests, staff acquire skills in conducting formal, 1:1 programs, activity areas, mealtime training programs, behavior reduction programs, and data analysis.

The last subject area, data analysis, includes recording data, graphing, and--the subject of this article--updating. Updating involves the use of a set of decision rules that are applied to daily, formal program data to determine what programmatic changes, if any, are needed to increase the effectiveness of training for individual residents.

BTC trainees receive information about updating in a lecture during the first of five class days. The lecture presents the rationale behind updating and the decision rules. Examples of the application of the decision rules to program data are given frequently throughout the lecture on an overhead projector.

During the time between the lecture and the exercise, each trainee is required to update all formal programs he or she conducts in the classroom. At the end of a program session, the trainee is requested to update the program for the next session, and an instructor provides immediate feedback on the accuracy of the result. In addition, the classroom manual contains an extensive

chapter on updating, although it is unknown to what extent the trainees avail themselves of this information.

On the fifth and last day of class, all trainees are required to complete a main updating exercise, consisting of a program "clipboard" for a hypothetical resident with five programs to be analyzed and updated. The performance criterion for the objective is 90% accuracy in updating the programs in accordance with the decision rules, commonly called the "Rules of Thumb."

Throughout the five-year history of the BTC, the updating exercise has been the most difficult academic objective for trainees to perform at criterion level on their initial attempts. In an effort to improve trainees' performance on the exercise, the BTC instructors have made some changes in the exposure to updating that trainees have received.

Initially, trainees were given the main exercise immediately after the updating lecture. Then, through the remainder of the training week, they received exposure to updating as described above. On the last day of class, they could attempt the exercise again, if they had not achieved a criterion performance on the first exercise.

In August of 1979, the procedure was changed to include a series of four daily practice exercises. Rather than attempting the main exercise immediately after the updating lecture, trainees received the first practice exercise. When they had completed the exercise, they were given immediate feedback by the instructor. Trainees then completed the remaining exercises on each of the following three days, and the main exercise was given on the fifth and final day of class. Performance scores were computed for each of the practice exercises, but only for purposes of feedback to trainees and instructors. The "official" scores for

trainees were the ones they received on the main exercise.

The practice exercises consisted of completed data sheets that were to be updated according to the Rules of Thumb. The exercises were arranged so that the required data analysis and updating procedures became more complex across the four exercises.

After the practice exercise procedure had been in effect for about nine months, trainee scores obtained on the main exercise were compared to trainee scores obtained on the same exercise before the practice exercises were implemented. The scores were chosen randomly from both groups of trainees. The data are presented in Table 1 below.

Table 1

First Attempt Scores on Main Updating Exercise by Trainees With and Without Daily Exercises

Group	n	Mean	Median	Range
No Daily Exercises	66	85.14%	75%	15-100%
Daily Exercises	66	82.44%	75%	30-100%

The comparison shows that the use of the daily practice exercises had no positive effect on trainees' performance on their first attempts to complete the main updating exercise. Anecdotal experience in correcting and providing feedback on the practice and main updating exercises revealed that, for the most part, trainees were analyzing the data correctly but were making errors in recalling and applying the relevant Rules of Thumb. Although the rules were presented during lecture in conjunction with frequent examples of their application, it appeared that this presentation did not provide a sufficient stimulus to elicit the behavior of updating according to the rules.

In an attempt to solve this problem, it was decided that the updating lecture would be kept intact, and a new series of practice exercises would be designed. The

new practice exercises were designed to more closely pair the Rules of Thumb with the process of updating. Thus, the first exercise used a multiple-choice format to review the information just presented in lecture, i.e., the Rules of Thumb. In the successive exercises, the stimuli and required responses were gradually changed so that trainees' behavior shifted from responding to questions about the Rules of Thumb to applying the rules while updating programs.

A pilot study was conducted in the BTC classroom to determine the relative effectiveness of the new practice exercises vis-à-vis the original practice exercises.

## METHOD

### Subjects

The subjects in the study were 23 trainees who attended the BTC class over six successive class weeks. Of the 23 trainees, 19 were employed in direct-care positions; the remaining four included a social worker, an audiologist, a nurse, and a personnel administrator.

### Procedure

The trainees in the second, fourth, and sixth class weeks comprised Group A (n=11) and received the original practice exercises. The trainees in the first, third, and fifth class weeks were in Group B (n=12) and received the new practice exercises. Each trainee was given a pretest, similar to the main updating exercise, before listening to the updating lecture on the first day of class.

The lecture and other activities related to updating were kept constant for both groups of trainees. The only difference between the two groups was the practice exercises they completed.

### Reliability

Reliability on the assignment of scores to the pretest and main updating exercises was done by having at least two instructors in the class rate each exercise, using a standard point assignment guide. In rating a given exercise, each rater summarized points credited and disallowed on a separate sheet of paper, so as not to influence others' ratings of the same

exercise.

Reliability between a pair of raters on a given exercise was computed by dividing the agreement on points credited/disallowed by the agreements plus disagreements on points credited/disallowed. The quotient was multiplied by 100 to obtain a percentage reliability figure. A total of 142 reliability checks were made in this way. Mean reliability among the raters was 97.9%, with a range of 73.9% to 100%.

## RESULTS

The results obtained for Groups A (old practice exercises) and B (new practice exercises) are presented in Table 2.

Table 2

First Attempt Scores on Main Updating Exercise by Trainees in Groups A and B

	Mean	Median	Range
Group A (n = 11) Old Daily Exercises			
Pretest	19.1%	25%	10-45%
Main Exercise	85.5%	85%	40-100%
Change	66.3%	62.5%	15-90%
Group B (n = 12) New Daily Exercises			
Pretest	24.6%	15%	10-50%
Main Exercise	93.8%	90%	80-100%
Change	68.3%	65%	40-90%

The data show that the trainees who received the new practice exercises achieved better scores on their first attempts at completing the main updating exercise. Group B also exhibited a greater change in performance from pretest scores to main scores than did Group A. Most importantly, the mean and median scores obtained on the main exercise by Group B were at criterion level, while the same figures for Group A fell below the 90% performance criterion.

## DISCUSSION

### Follow-up

Based on these results, the decision was made to use the new practice exercises on a regular basis in the BTC classroom. After 12 months, the scores obtained by trainees on their first attempts at the main updating exercise were analyzed. These data are presented below and compared to the data shown in Table 1.

Table 3

First Attempt Scores on Main Updating Exercises by Trainees with No Daily Exercises, Old Daily Exercises, and New Daily Exercises

	n	Mean	Median	Range
No Daily Exercises	66	85.14%	75%	15-100%
Old Daily Exercises	66	82.44%	75%	30-100%
New Daily Exercises	73	94.12%	80%	30-100%

The follow-up results, which do not include any data from the pilot study, indicate that the new daily practice exercises are helpful to trainees in successfully completing the main updating exercise.

The positive effects of the new practice exercises may be a result of the recognition that the classroom activities concerning updating involve two separate groups of behaviors. One group of behaviors consists of listening to a lecture, recording notes, and reiterating the content of the lecture. The second group of behaviors consists of analyzing raw data, recognizing trends of performance that correspond to the given Rules of Thumb, making decisions based on the rules, and implementing the decisions correctly.

The first group of behaviors would logically fall under the control of stimuli from the lecture setting, and the second group of behaviors should occur

in response to data sheets and the data on them. In the two conditions in which no daily exercises and the old daily exercises were used, trainees were expected to respond to the second set of stimuli with only a (supposedly) internalized set of decision rules to fall back on. In essence, they were asked to look at a novel set of stimuli and to make responses for which they had no training.

The new daily exercises were designed to bridge the gap: They begin by requiring familiar responses to familiar stimuli, and, in successive trials, they shape a new set of responses to new stimuli while fading out the former responses. The link between the two sets of responses is the Rules of Thumb, and, with the current set of daily exercises, trainees are having more success in applying those rules to updating problems.

## TIME SAMPLING: BOON OR BUST?

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A current topic of controversy in the field of applied behavior analysis concerns the use of time sampling procedures. Whole interval, partial interval, and momentary time sampling are discontinuous, time-based methods of measuring behavior that are commonly used when direct, continuous measurement of behavior is not feasible.

A fair amount of research has been conducted assessing the accuracy of various time sampling procedures in comparison with continuous measurement (Thomson, Holmberg & Baer, 1974; Powell, Martindale & Kulp, 1975; Powell, Martindale, Kulp, Martindale & Bauman, 1977; Murphy & Goodall, 1980). The general consensus from these studies is that a certain amount of error is to be expected from time sample measurements, and that such error is variable, depending on the response dimensions of the behavior in question. The literature suggests caution in selecting the proper type of time sample and length of recording intervals based on the particular behavior being observed.

In an articulate criticism of time sampling, Springer, Brown, and Duncan (1981) concluded that time sampling methods result in inherently inaccurate data. They raised the ethical considerations of using erroneous data to make decisions that affect client services. The alternative proposed by those who frown on time sample data is a return to the more rigorous, investigative approach typical of traditional behavior analysis (Dietz, 1978).

In essence there is a call for the development of techniques whereby direct, continuous measurement of behavior becomes more practical in applied settings. It is suggested that only then can all the response dimensions derived from the fundamental properties of the observed behavior be taken into account and reflected in the data (Springer, et al., 1981).

Time sampling methods are still the most widely used techniques for observing behavior in applied settings today, primarily because of their efficiency and high interobserver reliability. Due to the high costs of sophisticated recording equipment and manpower necessary for direct measurement of behavior, most researchers appear willing to accept the margin of error inherent in the use of time sampling procedures. It is argued that the data still reflect, with reasonable accuracy, changes in behavior across experimental conditions.

Our interest in time sample procedures is an outgrowth of several projects undertaken by the Boulder Training Center (BTC) in the past year. The first of these was designed to determine if different types of music would have differential effects on the amount of stereotypic behaviors exhibited by profoundly retarded clients. With the use of a partial interval time sample (recording whether a targeted behavior occurred at any point within a given interval of time), the data did not show significant differences between amounts of stereotypic behavior (SB) displayed by subjects under conditions of no music, classical music, and hard rock music.

These results prompted us to take a critical look at our recording technique, for anecdotal observation indicated that

substantial differences in SB were occurring across the separate conditions but were not reflected by partial interval time samples. Before committing manpower and time to any more research we decided that a pilot study comparing partial interval and momentary time sampling to each other and to direct, continuous measurement was needed.

## METHOD

### Subjects and Setting

Six of the residents (three female, three male) enrolled in the BTC during the winter of 1981 served as subjects for this study. All subjects were classified as profoundly retarded, and their ages ranged from 25 to 43 years.

The setting was the activity area of the BTC, a group training classroom. The room measures 5.8 m by 8.5 m and contains shelves with a variety of toys. The activity area was arranged such that the subjects were seated in assigned chairs around two semi-circular tables, with toys and other materials at their disposal.

### Procedure

During the day of the study, the subjects had access to the toys and materials in the activity area, but they received no instructional interaction from the BTC instructors. The subjects were free to leave their chairs but were required to remain in the room. No health or safety emergencies occurred during the recording periods.

The occurrence of stereotypic behavior (defined as repetitive, nonfunctional acts, including noncommunicative vocalizations) was measured across two conditions: one in which music was playing on a phonograph (Music) and one in which no music was playing (Quiet). The music was not selected for any particular characteristics but could be generally described as rock music.

Each condition was divided into three recording periods. During a given recording period, each subject was observed separately for one minute. Thus, each recording period lasted six minutes, totalling 18 minutes per condition and 36 minutes overall. Three observers simultaneously used the following three methods of recording to measure SB.

Duration. The observer used a hand-held, electronic stopwatch to record the cumulative amount of time that SB was exhibited by the subject under observation for one minute. At the end of the minute, the observer wrote down the cumulative total registered on the stopwatch, reset the watch to zero, and began observing the next subject.

Partial interval time sampling. Each minute of observation was divided into 10-second intervals. A tone on an audiotape signalled the end of each interval (and the beginning of the next interval). For each interval, the observer recorded a "+" if the subject under observation exhibited SB at any time during the interval. If no SB was observed during an interval, the observer recorded a "-" for that interval.

Momentary time sampling. Each minute of observation was divided into 10-second intervals. The observer used the same audiotaped tones to cue his observations that were used for partial interval time sampling. At the sound of a tone, the observer looked for one second at the subject under observation. He then recorded a "+" for the interval if the subject exhibited SB during that second; a "-" was recorded if no SB was occurring during that second.

The three observers (instructors in the BTC) used each recording technique twice, once during the Music (M) condition and once during the Quiet (Q) condition. Table 1 shows the rotation of observational roles.

Table 1

Rotation of roles for three observers using duration (DUR), momentary time sampling (MTS), and partial interval time sampling (PTS).

Recording Period	OBS 1	OBS 2	OBS 3
M <sub>1</sub>	DUR	MTS	PTS
M <sub>2</sub>	MTS	PTS	DUR
M <sub>3</sub>	PTS	DUR	MTS
Q <sub>1</sub>	PTS	DUR	MTS
Q <sub>2</sub>	MTS	PTS	DUR
Q <sub>3</sub>	DUR	MTS	PTS

No reliability observations were conducted.

## RESULTS

The results are presented in Figures 1 and 2. Figure 1 shows the levels of stereotypic behavior obtained for each recording method across the six recording periods. Figure 2 represents the percentage of measurement error (overestimation and underestimation) of the partial interval and momentary time

samples, as compared to the zero reference line of direct, continuous measurement (duration).

The partial interval time sample resulted in a consistent overestimation of the occurrence of SB. The mean measurement error of the partial interval time sample was 19.16%. The momentary time sample, on the other hand, both overestimated and underestimated the occurrence of SB, with a mean measurement error of 9.16%.

## DISCUSSION

The results of this brief study are consistent with the findings of many other, more extensive studies (Thomson, et al., 1974; Powell, et al., 1975; Powell, et al., 1977; Murphy & Goodall, 1980). The smaller measurement error of momentary time sampling favors its use over the partial interval time sample method. Based on these results, we have conducted several projects in the BTC using momentary time sampling as a measurement tool.

The question must inevitably arise: Why use time sampling at all? The issues raised by Springer, et al., (1981) are quite valid; time sample data are inaccurate and often overly simplistic. It is undoubtedly preferable to use direct, continuous measurement of behavior whenever possible. However, in an applied

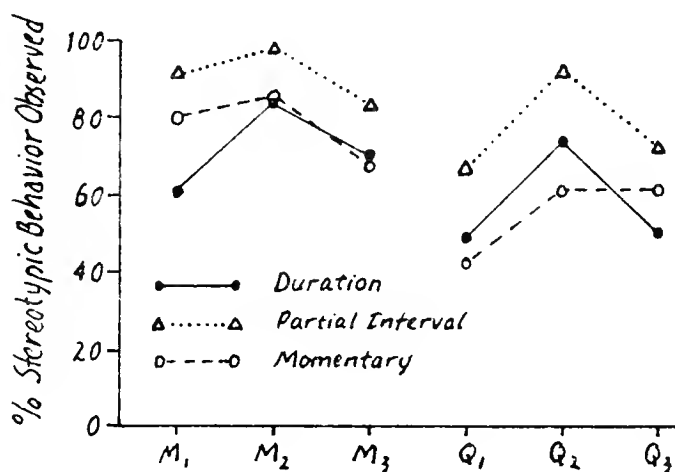


Figure 1. Levels of stereotypic behavior obtained through three methods of measurement across conditions of Music (M) and Quiet (Q).

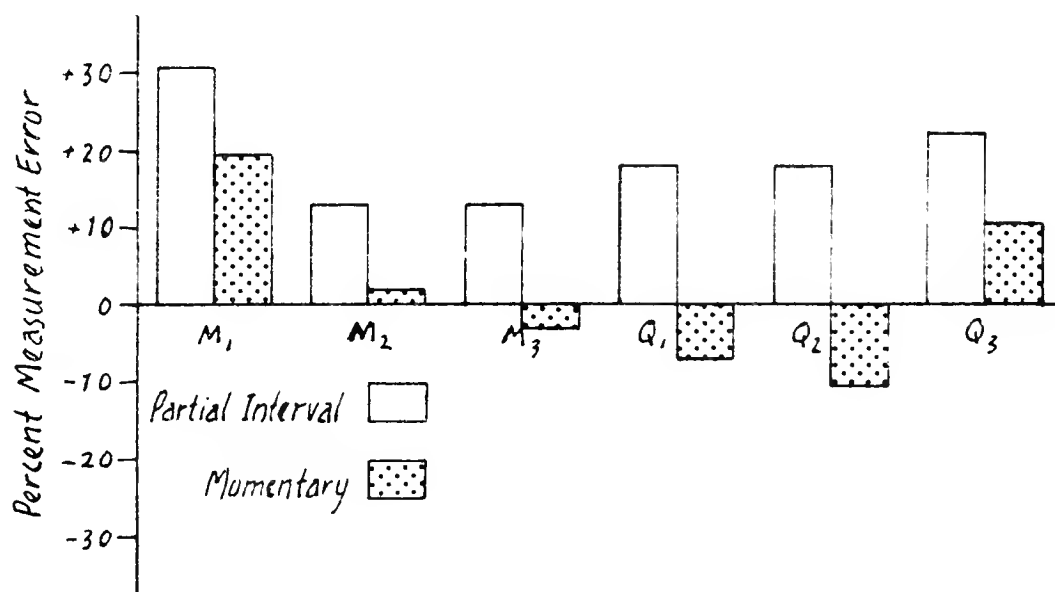


Figure 2. Partial and momentary time sampling measurement error, compared to direct measurement of response duration (zero abscissa).

setting such as this institution, the limitations of time sampling for data collection have to be accepted and mitigated through rigorous experimental design and specific response definition. We feel confident that when such steps are taken, time sample data are sufficiently sensitive to detect behavior changes that result from manipulation of the independent variable.

While we would like to afford the manpower or machines to systematically conduct direct, continuous measurement in applied settings with group designs, practicality is the controlling factor. Time sampling appears to present the most practical and accurate method for gathering the necessary data until methods of direct, continuous observation are developed that are efficient and economical (in terms of both time and money). We welcome such innovation, but we also see the need to search for increasingly sophisticated and accurate methods of collecting time sample data.

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## A METHOD FOR TEACHING TWO- AND THREE-WORD PHRASES TO DEAF, DEVELOPMENTALLY DISABLED PERSONS

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Inadequate communication skills have often been considered one aspect of retardation. Deficiencies may include limited vocabulary, incorrect articulation, and faulty grammatical structures, as well as other problems. Language usage, either verbal or by use of manual signs, is heavily weighted in estimates of intelligence; both the Stanford-Binet and the Weschler Scales include vocabulary items in I.Q. estimates. The present article presents a procedure to increase manual sign vocabulary, use of phrases, and spontaneous communication. Included in this article is a procedure to generalize the skill to novel settings and a maintenance procedure.

#### METHOD

##### Subjects

The subjects were two hearing impaired, developmentally disabled individuals. Subject A is a 30 year-old male in the mild range of retardation. Subject B is a 32 year-old male in the moderate range of retardation. Both subjects have received manual sign training at the single word level.

Criteria for subject selection were that the individual (1) be recommended for training in manual sign at the two-word level by the Individual Habilitation Planning Committee as a number one priority, (2) be able to produce the manual signs and have functional use of all the nouns and verbs to be used in the training, and (3) be significantly hearing impaired.

##### Setting & Materials

A small room in the school building was used for the training sessions. The room was furnished with two tables, an assortment of chairs, and a storage cabinet.

Forty-six picture cards that showed an individual or an animal performing an action were used as stimulus objects. In



this paper they will be referred to as the "stimulus pictures."

### Procedure

Subject A was seen once a day, Monday through Friday, in half-hour individual sessions. Subject B was seen once a day, Monday through Thursday, in half-hour individual sessions. The subject and trainer sat opposite each other at a table. Following each training session, the percent of correct responses made by the subject was computed and graphed.

Imitation. The subject was presented with a stimulus picture and a manually signed cue, "What is this?" Any partially correct response was socially reinforced. The trainer then modeled the correct response. If the subject imitated correctly, he received social and edible reinforcers. If the subject did not respond with the correct manual sign, he was prompted to perform the correct manual sign, after which reinforcement was given.

Independent production. The subject was presented with a stimulus picture and a cue, in manual sign, "What is this?" If the subject responded with the correct phrase in manual sign, a primary reinforcer was delivered. If the subject responded incorrectly, it was recorded as an incorrect trial. The correct phrase was then modeled, and the subject was prompted to perform the correct response. Then social reinforcement was given.

Generalization of word usage. The phrases used in the program were constructed so that each noun was used in combination with two different verbs, and each verb was used in combination with two different nouns. A word such as "eat" would be used in two different phrases, such as "Man eat" and "Eat food." This was done to generalize the usage of words.

Generalization to different settings. The subject received training in his living environment by a cottage staff person using the same procedure as described in the independent production section.

Maintenance training. The complete list of phrases used in the program was divided into four groups and labeled A, B, C, and D. During each session of maintenance training, the subject was required to respond to each stimulus

picture in one of the maintenance groups. The maintenance groups were rotated in a random manner. Primary reinforcement was faded.

Maintenance test. The subjects were presented with a stimulus picture and a cue, in manual sign, "What is this?" A correct response was recorded as correct. An incorrect response was recorded as incorrect. No corrections and no reinforcers were given. The phrases selected for the test were the first 10 phrases taught. The maintenance tests were conducted in the subjects' living environment.

### Staff Training

Manual sign language training was provided to the cottage staff in the living environments of both subjects. The staff were tested on their signing skills before and after they received sign training.

A word list was formed from the phrases used in training with the subjects. The signs were demonstrated to the staff, and staff members were individually asked to form the sign for a randomly selected word from the word list. Then two-word phrases were demonstrated in sign, and staff members were asked to form the sign for a randomly selected two-word phrase composed from the word list. The same procedure was used with three-word phrases. At this point the word list was passed among the staff, and each staff member in turn would select a three-word phrase and sign it to the other staff members, who would identify the phrase.

The staff was tested before and after a series of five inservice training sessions. The test was created by selecting 10 words from the subjects' word list, creating 10 two-word phrases from the word list, and creating five three-word phrases from the word list. The trainer formed the sign or signs, and the staff would select an answer on a multiple-choice answer sheet. There were four words or phrases to choose from for each of the 25 signs or phrases demonstrated.

## RESULTS

### Subject A

Subject A did not receive training in the imitation phase. In the first six sessions, one stimulus picture was presented for 20 trials each session.



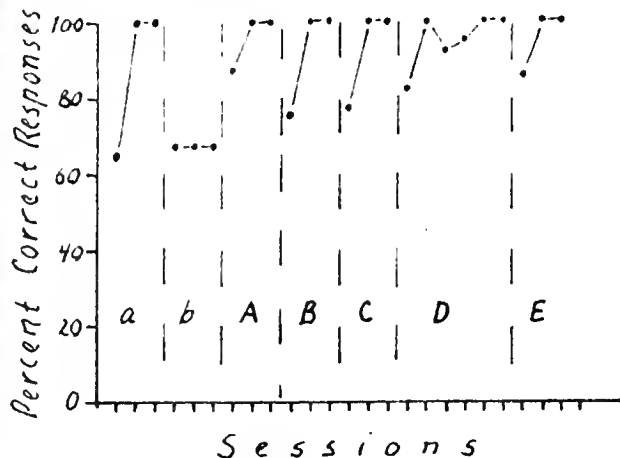


Figure 1. Subject A's performance on independent production of two-word phrases in response to single pictures (a&b) and to six-picture sets (A-E).

For all other training sessions in the independent production phase, six stimulus pictures were presented in a random order to equal 24 trials with four trials per stimulus picture. In the first 24 sessions, a response of independent production of a two-word phrase in manual sign correctly describing the stimulus picture was reinforced. An average of 3.6 sessions was necessary to achieve the 100% across two sessions graduation criterion for each set of six stimulus pictures (see Figure 1).

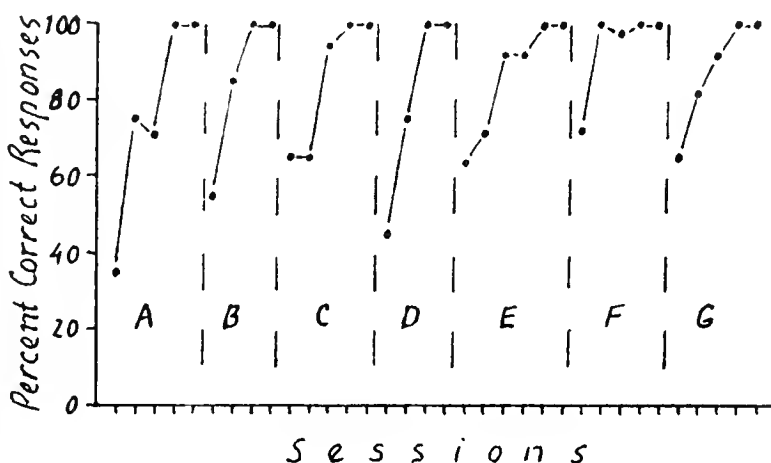


Figure 2. Subject A's performance on independent production of three-word phrases in response to six-picture sets (A-G).

In the following 34 sessions, a response of independent production of a three-word phrase in manual sign that correctly described the stimulus picture was reinforced. An average of 4.86 sessions was necessary to achieve the 100% correct across two sessions graduation criterion for each set of six stimulus pictures (see Figure 2).

Subject A received 12 sessions of training in the independent production phase in his living environment by a cottage staff person, using the same set of stimulus pictures as was used by the original trainer in the training environment. Subject A achieved 100% correct in every session of training in his cottage.

Following the training sessions of teaching three-word phrases, there were 19 sessions of maintenance training (see Figure 3). Subject A averaged 92.5% correct on maintenance group A. He averaged 92.9% on maintenance group B. He averaged 92.0% on maintenance group C. He averaged 97.9% on maintenance group D. The average percent correct across all sessions of maintenance training was 93.18%.

#### Subject B

Five stimulus pictures were presented in random order to equal 20 trials, with four trials per stimulus picture during each session. Subject B received 37 sessions of training in the imitation and the independent production phases of the program.

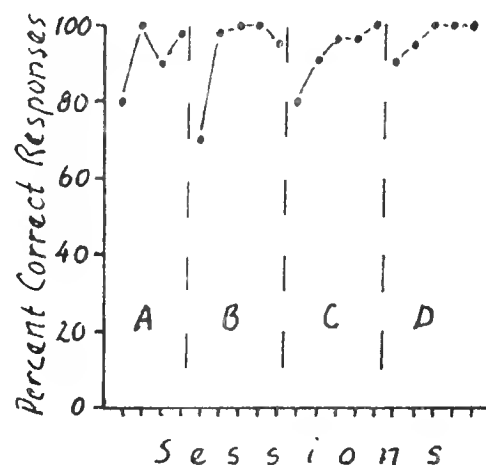


Figure 3. Subject A's performance during maintenance training on four groups (A-D) of all trained phrases.

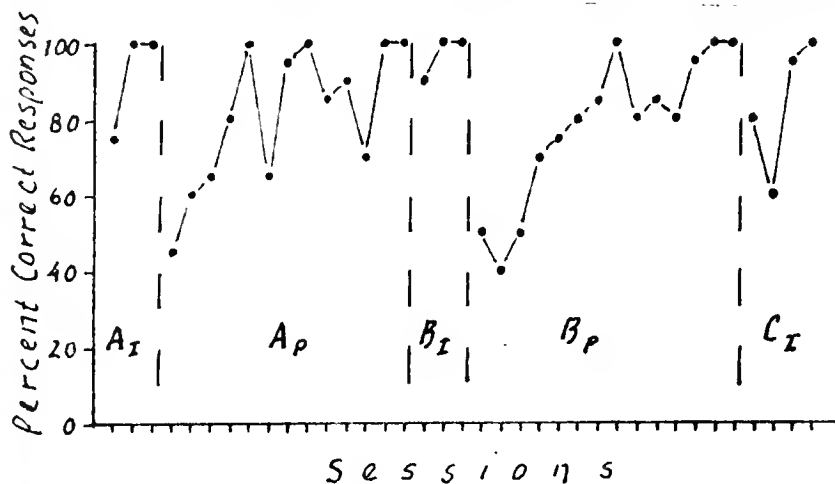


Figure 4. Subject B's performance on imitation (I) and independent production (P) of two-word phrases in response to five-picture sets (A-C).

The subject was required to imitate the behavior that the trainer modeled until correct responses occurred at 100% across two consecutive sessions. Once this graduation criterion was achieved in the imitation phase, the same set of stimulus pictures would then be used in the independent production phase of the training. Reinforcement was on a FR-1 schedule.

An average of 3.3 sessions were necessary to achieve the 100% correct across two sessions graduation criterion for each set of five stimulus pictures in the imitation phase of the training. An average of 13.5 sessions were necessary to achieve graduation criterion in the independent production phase of the training (see Figure 4). Subject B did not receive training to generalize the skill to different settings, nor did he receive the maintenance training.

#### Maintenance Testing

Subject A was tested on three separate occasions for maintenance of the skills. Subject B received maintenance testing on two separate occasions. The tests were conducted in the subjects' living environments. Each of the tests was seven days apart. The first test occurred seven days after the last session of training included in this article. (Note: Subject B continued in training with two-word phrases.)

The tests revealed that subject A main-

tained the skill at 100% correct among 20 randomly selected phrases from all the previous training. Subject B maintained the skill at 62.5% correct among 20 randomly selected phrases from all previous training.

#### Staff Training

The staff in Subject A's cottage was pretested and posttested on their signing skills. They received 10 hours of training in manual sign language between pretest and posttest. On the pretest, the staff's scores averaged 79% correct. The staff scored an average of 99.7% correct on the posttest.

#### DISCUSSION

The results indicate that this method is effective for teaching two- and three-word phrases in manual sign language to severely hearing impaired, developmentally disabled individuals in the profound to mild range of retardation. This conclusion is based on the fact that the percentage of correct responding to a particular group of stimulus pictures increased after specific training on that group.

The results indicate that, in addition to training a skill, considerations need to be made for developing the maintenance and generalization of the skill. This is indicated by the comparison of 100% skill retention by subject A, and 62.5% skill retention by subject B. Subject A received training for the maintenance of the skill through review of the signs that were taught, the fading of primary reinforcers, and training in the cottage by cottage staff. Subject B did not receive these important points in the training. Subject A maintained the skills to a much greater degree than did subject B. To test this conclusion thoroughly, it would be necessary to complete the training with subject B.

Logic dictates that it is necessary that the staff in the subjects' living environments be able to efficiently communicate

in manual sign. If the staff cannot communicate with the subjects, the subjects will not receive reinforcement in the natural environment for using manual signs to communicate. Results from tests administered to the staff reflect an increase in their signing skills. Staff use of these skills will reinforce the subjects for using manual signs and may maintain their skills. Ultimately, if the ability to communicate and have needs and wants understood, being able to understand directions or orders, and gaining information will be sufficiently reinforcing to maintain the skill of communicating with manual sign, then the goal of the program will have been reached.

Anecdotal observation by this trainer and by cottage staff indicates that spontaneous use of manual signs by subject A are increasing.

Editor's note: This paper was written as a part of the author's practicum study through Western Montana College. Mr. Scoville is presently an Habilitation Aide III in a cottage at Boulder River School and Hospital.

## THE SEVERELY HANDICAPPED IN PRODUCTION

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Today a greater number of severely and profoundly handicapped individuals than ever are receiving vocational training and becoming productive citizens. The number of severely handicapped people in vocational settings is a direct result of litigation resulting in affirmation of rights. There is the right to treatment, the right to education, and now many believe the severely handicapped have the right to work. Sheltered workshops and work activity centers are developed to meet the needs of the population coming out of the state institutions, as well as the needs of handicapped people

already in the community who were receiving no services.

Early in the deinstitutionalization process, the less severely handicapped were placed in the community. As deinstitutionalization continues, the problems are numerous. The people who remain in the institutions in Montana, as in many other states, have one or a combination of the following problems: 1) severe or profound mental retardation, 2) severe physical handicaps, 3) severe medical problems, 4) severe behavior disorders. These people are being slowly placed into community sheltered work situations and are beginning to be productive. Because the higher functioning residents have been moved out of the institutions, the lower functioning residents are at last receiving training in the institutions.

A number of studies have demonstrated that severely handicapped individuals can learn a variety of work skills (Gold, 1972; O'Neill & Bellamy, 1978; Wehman & Hill, 1979). These studies predominately investigate assembly tasks. Gold (1972) worked with bicycle brake assemblies. O'Neill & Bellamy (1978) studied the assembly of a saw chain. Wehman & Hill (1979) studied a variety of tasks, including ball point pen assembly, jump rope assembly, photo flyer assembly, boiler drain assembly, and one task involving sorting defective circuit breaker pieces. In Montana, due to the lack of industry, productive assembly tasks are not readily available. Transportation also poses a problem. Assembly could be done in Montana, but this would require shipping to other states. So, while Montanans can replicate the assembly tasks, it may not be feasible because of the lack of local industry and transportation costs. The benefit gained from assembly studies is the knowledge that severely handicapped individuals can learn and can be productive.

Work activity centers in Montana are adjusting to the influx of the more severely handicapped individuals and are providing productive work settings for them. Several examples are evident. The Easter Seal Adult Training Center in Great Falls does much prime manufacturing, making items which are sold directly to the public,

as well as contracted projects. Pat Moyer, the project director, relates that the severely handicapped clients are involved in making wooden items and silk screening. The severely handicapped perform the easiest tasks, while more capable clients do the more difficult tasks. Thus, all the clients work together to bring a job to completion.

Freda Kanga related some of the projects carried out at the work activity centers in Regional Services for the Disabled, a nonprofit corporation with centers in Billings, Red Lodge, Lewistown, and Hardin. The products these sites are producing include, but are not limited to, silk-screening, picnic tables, upholstered chairs and couches, clothes racks, and bread boards.

Boulder River School and Hospital's prevocational training program provides services for some of the most severely handicapped individuals in Montana. These people are also involved in productive work. They are assembling ball point pens, rolling newspaper logs, refinishing furniture, making ceramic items, and crushing cans and binding newspapers for recycling.

#### SUMMARY AND CONCLUSIONS

The severely handicapped are indeed productive citizens. A wide variety of productive tasks are performed. Workshops and work activity personnel are exploring a wide continuum of production possibilities for the severely handicapped population. Much creative energy has gone into the development of programs and much more is required before we find jobs for all. Vocational instructors must be aware of the variety of jobs for which they are preparing their students. Cook and Dahl (1977) of Palo Alto, California, must be identifying problems similar to our own when they write of the "cluster" system:

One problem of many vocational education programs is that vocational instruction is too narrow to meet the variety of skills that may be required on the job. One area of investigation should focus on the extent to which severely handicapped persons can be trained for a variety of jobs using the cluster system used

for vocational training of nonhandicapped students. Instead of concentrating solely on specific tasks, the cluster concept concentrates on teaching systems of obtaining information that enable workers to perform any job that may be relevant. Ways are needed to teach basic skills in vocational education programs for the severely handicapped that will transfer as widely as possible to jobs in the world of work so that the handicapped person may have as many options as possible.

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*Occupational Opportunities! Next page...*

## POSITIONS AVAILABLE

**SPECIAL EDUCATION TEACHER.** Starting salary ranges from \$14,661 to \$24,601 annually, depending on years of relevant education and experience. Responsible for teaching self-help, language, pre-vocational, community, or pre-academic skills to severely and profoundly handicapped persons. Requires B.A. in Special Education and regular teaching certificate endorsement in Special Education.

**OCCUPATIONAL THERAPIST II.** Starting salary ranges from \$17,603 to \$18,525 annually. Position is responsible for program development; supervises and instructs aides and trainees. Requires B.A. in Occupational Therapy, with two years' experience preferred.

**PHYSICAL THERAPIST SUPERVISOR.** Starting salary ranges from \$19,165 to \$20,165 annually. Excellent benefits. Responsible for a staff of six; plans and directs therapy programs. M.A. degree in Physical Therapy preferred, will consider B.A. degree with experience. Must be licensed or eligible in Montana.

**STAFF PHYSICAL THERAPIST.** Starting salary ranges from \$17,603 to \$18,525 annually. Excellent benefits. Assists Supervisor in planning and directing therapy programs, provides services to developmentally disabled clients. B.A. degree in Physical Therapy is required.

**SPEECH/LANGUAGE PATHOLOGIST.** Starting salary \$17,603 annually, with increase to \$18,525 after a six-month probationary period. Provides evaluations, diagnoses, and remediations for communication disorders in developmentally disabled clients. Serves as a resource person to cottage staff and serves on an interdisciplinary evaluation and planning team.

**AUDIOLOGIST.** Starting salary \$17,603 annually, with increase to \$18,525 after a six-month probationary period. Provides a full range of audiological services, including diagnosis, hearing aid evaluation, and aural remediation programs. Requires M.A. in Audiology, with CCC preferred or

academic requirements completed. Manual communication skills preferred.

**STAFF DEVELOPMENT INSTRUCTOR** (Training Officer III). Starting salary \$16,060 annually. Provides basic information in health care procedures and institutional communications to newly hired staff; provides advanced health care information to candidates for promotion; develops and delivers inservice training to other institutional staff in areas of professional expertise. RN or related education preferred; one year of experience in staff development or work with developmentally disabled (or relevant combination of education and experience).

**REGISTERED NURSE.** Part-time and/or full-time positions. Starting salaries (full time) range from \$17,991 to \$19,710 annually. Graduates of two-, three-, or four-year accredited RN programs considered.

Please direct inquiries concerning the above positions to: Personnel Office, Boulder River School and Hospital, P.O. Box 87, Boulder, MT 59632. Phone: (406) 225-3311, ext. 284. Equal opportunity employer.

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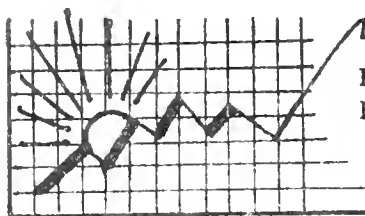
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